

CLAIMS

What is claimed is:

1. A low dielectric material, comprising:

a polymer composition, wherein the polymer composition comprises at least one polymer component that further comprises at least one monomer component and wherein the at least one monomer component comprises a radical precursor chemically bonded to a structural precursor.
2. The low dielectric material of claim 1, wherein the radical precursor volatilizes during a cure process to form a plurality of ultranano-pores and a gas.
3. The low dielectric material of claim 1, wherein the structural precursor forms a support material during a cure process.
4. The low dielectric material of claim 1, wherein the structural precursor comprises a siloxane compound.
5. The low dielectric material of claim 4, wherein the siloxane compound comprises an hydridosiloxane compound.
6. The low dielectric material of claim 4, wherein the siloxane compound comprises an organohydridosiloxane compound.
7. The low dielectric material of claim 1, wherein the structural precursor comprises an organic compound.
8. The low dielectric material of claim 7, wherein the organic compound comprises a poly(arylene) ether compound.
9. The low dielectric material of claim 7, wherein the organic compound comprises a cage molecule.

10. The low dielectric material of claim 9, wherein the cage molecule is an adamantane-based molecule.
11. The low dielectric material of claim 1, wherein the radical precursor comprises an alkyl group.
12. The low dielectric material of claim 11, wherein the alkyl group comprises at least one branched alkyl component.
13. The low dielectric material of claim 1, wherein the radical precursor comprises a cycloalkyl group.
14. The low dielectric material of claim 1, wherein the radical precursor comprises an aromatic group.
15. The low dielectric material of claim 1, wherein the radical precursor comprises at least one saturated bond.
16. A low dielectric film comprising the low dielectric material of claim 1.
17. An electronic component comprising the low dielectric material of claim 1.
18. An electronic component comprising the low dielectric film of claim 16.
19. A layered component comprising the low dielectric material of claim 1.
20. The low dielectric material of claim 1, wherein the material has a dielectric constant of less than about 3.
21. The low dielectric material of claim 20, wherein the material has a dielectric constant of less than about 2.5.
22. The low dielectric material of claim 21, wherein the material has a dielectric constant of less than about 2.
23. The low dielectric film of claim 16, wherein the film has a dielectric constant of less than about 3.

24. The low dielectric film of claim 23, wherein the film has a dielectric constant of less than about 2.5.
25. The low dielectric material of claim 25, wherein the film has a dielectric constant of less than about 2.
26. The low dielectric material of claim 2, wherein the plurality of ultrananopores comprises at least two voids.
27. The low dielectric material of claim 26, wherein each of the at least two voids comprises a mean diameter of less than about 10 nanometers.
28. A method of forming a low dielectric material, comprising:

providing a polymer composition, wherein the polymer composition comprises at least one polymer component that further comprises at least one monomer component and wherein the at least one monomer component comprises a radical precursor chemically bonded to a structural precursor;

applying energy to the polymer composition, such that the radical precursor is volatilized; and

liberating at least in part the radical precursor from the polymer composition.
29. The method of claim 28, wherein forming the low dielectric material further comprises curing the polymer composition to form a support material and a plurality of pores.
30. The method of claim 29, wherein the plurality of pores comprise nanopores.
31. The method of claim 29, wherein the plurality of pores comprise ultrananopores.
32. The method of claim 28, wherein applying energy to the polymer composition comprises applying heat.
33. The method of claim 28, wherein the radical precursor comprises an alkyl group.

34. The method of claim 33, wherein the alkyl group comprises at least one branched alkyl component.
35. The method of claim 28, wherein the structural precursor comprises a siloxane compound.
36. The method of claim 35, wherein the siloxane compound comprises an hydrosiloxane compound.
37. The method of claim 35, wherein the siloxane compound comprises an organohydrosiloxane compound.
38. The method of claim 28, wherein the structural precursor comprises an organic compound.
39. The method of claim 38, wherein the organic compound comprises a poly(arylene) ether compound.
40. The method of claim 38, wherein the organic compound comprises a cage molecule.
41. The method of claim 40, wherein the cage molecule is an adamantane-based molecule.